



# OWNER'S OPERATING MANUAL

Rackmount SG Series UPS Plus®

## Uninterruptible Power Supply Models:

SG1KRM-1TU, SG1KRM-2TU

SG2KRM-1TU, SG2KRM-2TU

SG3KRM-1TU, SG3KRM-2TU



Detailed SG Series product specifications are available in PDF format at [www.falconups.com](http://www.falconups.com)

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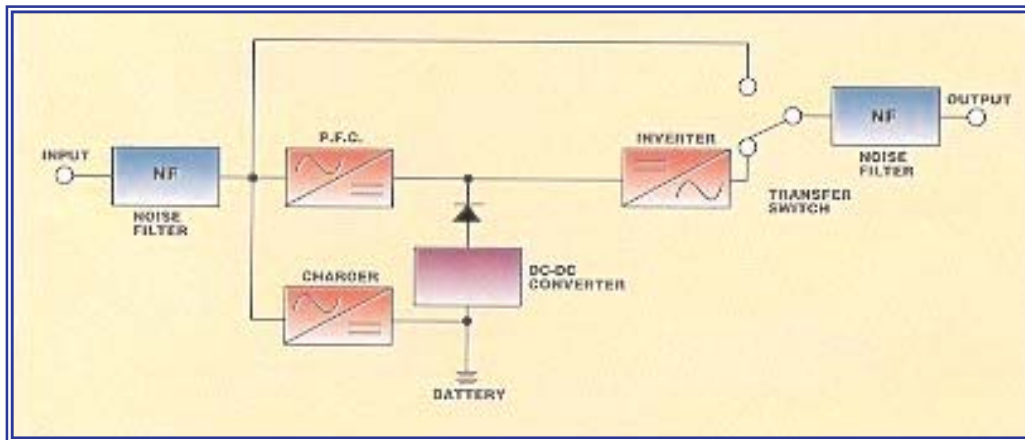
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## SG SERIES UPS FEATURES

- True Double Conversion On-Line Design
- Input Power Factor Correction
- Wide Input Voltage Window
- Pure Sinewave Output
- Precision Output Voltage Regulation
- Superior Brownout, Surge and Transient Protection
- Internal System Bypass
- Eliminates Generator Frequency & Voltage Drift
- Microprocessor Control & RS-232 Communications
- UPSILON® Monitoring & Shutdown Software
- Optional Frequency Conversion
- Optional Extended Battery Packs & Chargers
- Optional External Maintenance Bypass Switch
- Optional Internal SNMP/HTTP Interface Card
- Two-Year Warranty

### SG SERIES ON-LINE UPS SYSTEM BLOCK DIAGRAM



# IMPORTANT SAFETY INSTRUCTIONS

## SAVE THESE INSTRUCTIONS

This manual contains important instructions which must be followed during the installation, operation and maintenance of this UPS and its batteries. Please read all instructions before operating this equipment and save this manual for future reference.

### CAUTION

All of the models presented herein are designed for installation and use in a temperature controlled environment, free of contamination.

### CAUTION

This UPS utilizes voltage that may be hazardous. Do not attempt to disassemble. This unit contains no user replaceable parts. **Refer all servicing to Falcon Electric, Inc.**

### CAUTION

**THIS UPS IS NOT INTENDED TO BE USED IN CONJUNCTION WITH LIFE SUPPORT OR OPERATING ROOM EQUIPMENT.**

### CAUTION

Always unplug this UPS and remove the UPS battery fuse prior to cleaning and never apply liquid or spray detergent on the UPS.

### CAUTION

**Never attempt to service batteries.** High voltage exists within the unit, which could cause electrical shock. Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries. When replacing the UPS batteries, use the same number and type of batteries.

### IMPORTANT

Allow at least 24 hours, after the UPS is first installed and turned on, to fully charge the internal battery and assure the maximum backup time is available.

### DO NOT

**DO NOT** plug this UPS into its own output as this may damage the UPS. **NEVER CONNECT** equipment that could overload the UPS or demand half-wave rectification from the UPS, for example: electric drills, vacuum cleaners or hair dryers. Never connect surge protected plug strips to the UPS output.

### CAUTION

**DO NOT** remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.

### CAUTION

**This UPS contains its own energy source (batteries). The output receptacles may carry live voltage even when the UPS is not connected to an AC source.**

### IMPORTANT

**Should any SG Series UPS models be stored for more than two weeks, it is mandatory that the battery fuse be removed prior to storage or battery damage will result.**

# CHAPTER 1

## SG Series UPS - Overview

### **True Regenerative On-Line Design**

As new and innovative technologies have become the backbone of today's businesses, maximum system availability is critical and downtime is more expensive than ever. Increasingly, businesses need a UPS that not only protects against blackouts, but also virtually eliminates more frequent and subtle power disturbances. Surges, sags, line noise and brownouts can disrupt proper operation of sensitive equipment. These disturbances may also create unnecessary production, service, and data recovery costs.

A True Regenerative On-Line UPS provides the highest level of protection against the widest spectrum of power problems. The incoming AC utility source is converted to a regulated DC voltage. From this DC voltage, a new AC voltage is generated, providing continuous, clean, tightly regulated power to your equipment. Line-interactive and Off-line designs leave your equipment connected directly to dirty utility power. They only provide minimal transient, voltage and backup protection. If your equipment operation is "Mission Critical", a true double conversion On-Line UPS, such as Falcon® Electric's SG Series<sup>T</sup> UPS Plus®, is the only clear choice.

### **Input Power Factor Correction**

All SG Series UPS Plus models include state-of-the-art Input Power Factor Correction. This greatly reduces the amount of current demanded from your building wiring system, yielding a highly efficient, "building friendly" UPS.

### **Microprocessor Control**

Falcon Electric's SG Series UPS incorporates advanced microprocessor technology. This technology makes possible a high level of internal UPS control and management. With the supplied UPSILON® software, all SG Series UPS models support unattended shutdown, management, data logging, and self-diagnostics. The software supports MS Windows® 95, 98, NT, 2000, 2000 Server, ME, XP, Novell Netware® 5 & 6, LINUX and FreeBSD. UPSILON for UNIX is available as an option and supports most popular UNIX platforms and OS versions.

### **SNMP/HTTP Remote Management Support**

Our SNMP/HTTP Agent board provides remote management and monitoring over any Ethernet LAN, WAN or the Internet utilizing a 10BaseT-type connection. The optional SNMP/HTTP agent installs via an option slot located behind a cover plate on the back panel of every SG Series model.

### **Extended Battery Bank Option**

All SG Series models have a continuous duty inverter and support the addition of optional external battery/charger packs. Whether your application requires a few additional minutes or hours, the SG Series will be ready. Falcon also offers optional battery charger upgrades for faster recharging. Please specify your extended battery requirements at the time of your initial order. Contact the factory for battery charger options.

### **Frequency Converter Option**

With a factory modification at the time of order, any SG Series model can be configured for use as an international frequency converter. This makes the SG Series UPS Plus an ideal choice for worldwide power applications. Without this modification, all SG series models will detect the incoming utility line frequency and automatically set the output frequency to match the input.

## CHAPTER 2

### SG RACKMOUNT INSTALLATION INSTRUCTIONS

1. Verify the following is included in the UPS shipping carton:
  - \* UPS
  - \* Software Diskette(s) & Manual
  - \* Power Cord
  - \* Owners Manual
  - \* UPS/Computer Cable
  - \* Box containing mounting brackets, handles & mounting hardware
  - \* SG2KRM-1TU, SG2KRM-2TU, SG3KRM-1TU & SG3KRM-2TU do not have batteries inside the UPS enclosure and are shipped with an additional rackmount battery module. Verify the battery interconnect cable and another small box containing mounting brackets, handles and mounting hardware are present inside the battery module shipping carton..
2. Verify the UPS unit is configured for the proper input/output voltage and frequency. This information is stated on the nameplate label located on the rear or the side panel of the unit. If any special input plug and output receptacle configurations were specified at the time of order, verify for proper configuration
3. **RACKMOUNT UPS MOUNTING INSTRUCTIONS --- IMPORTANT---**
  - a. **NEVER MOUNT THE UPS OR ANY ASSOCIATED BATTERY BANKS USING ONLY THE FRONT PANEL MOUNTING EARS AS DAMAGE WILL RESULT!** All Falcon rackmount UPS and battery modules are designed to be supported by a shelf mounted to both front and rear rails of the rack. Shelves are available from the manufacturer of your particular rack enclosure. Select a shelf that can support 150 pounds of weight, minimum.
  - b. Use the following instructions to assemble the supplied mounting brackets and handles, and to install the bracket assemblies to the UPS, and battery module (if supplied).

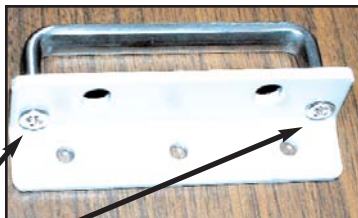
Step 1.  
Locate the mounting hardware kit(s)



Step 2.  
Remove the screws from their plastic bag and identify.



Step 3.  
Using two Flat Head screws, fasten the chrome handles to each bracket



Step 4.  
Using the remaining Pan Head screws, fasten the bracket assembly to both sides of the UPS and battery banks (if supplied).



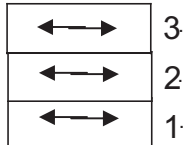
- c. Install a suitable shelf capable of supporting the weight of the UPS and batteries into the equipment rack. Install the shelf so the UPS and battery bank (if required) will sit directly on the surface of the shelf. Lift the UPS onto its rack shelf, slide it into the rack until the UPS front panel is flush with the racks front rails, securing it to the rails using four screws, (supplied by the rack manufacturer).
  - d. For 2-3Kva models, lift the primary battery module onto its rack shelf, slide back it until the the front panel is flush with the racks front rails and secure it to the rails using four screws (supplied by the rack manufacturer).
4. There are three switches located on the UPS rear panel. Please reference the diagram below.
- a. Two of the switches set the nominal UPS output voltage. Set switch 1 and 2 to the desired output voltage setting. In most cases the nominal UPS output voltage should be set to match the incoming utility voltage. This will assure a close matching voltage in the event the UPS is placed on bypass.
  - b. Dip switch 3 "enables" or "disables the "Green Mode" function. The UPS is shipped from the factory with the switch set in the "disabled" position (to the right), turning off the green mode function. If SW3 is switched to the left or to the "enabled" position the Green Mode function is activated and when the load connected to the output of the UPS drops to under 10% of its rated output, the UPS is automatically set to bypass after 30 seconds and the inverter is turned off reducing the power requirement.  
**NO BATTERY BACKUP IS PROVIDED WHEN IN THIS MODE.**
  - c. Switch settings must be made while the UPS is turned off. Any changes made while the ups is turned on will not take effect until the UPS is turned off and back on again as the switch settings are read by the microprocessor only during inital UPS power up.


UPS OUTPUT VOLTAGE DIP SWITCH SETTINGS

SW2	SW1	100-120V MODELS ONLY	200-240V MODELS ONLY
←	←	100V	220V
←	→	110V	230V
→	←	120V	240V
→	→	115V	200V

SW3	GREEN MODE
→	DISABLED
←	ENABLED

SWITCHES ON UPS REAR PANEL

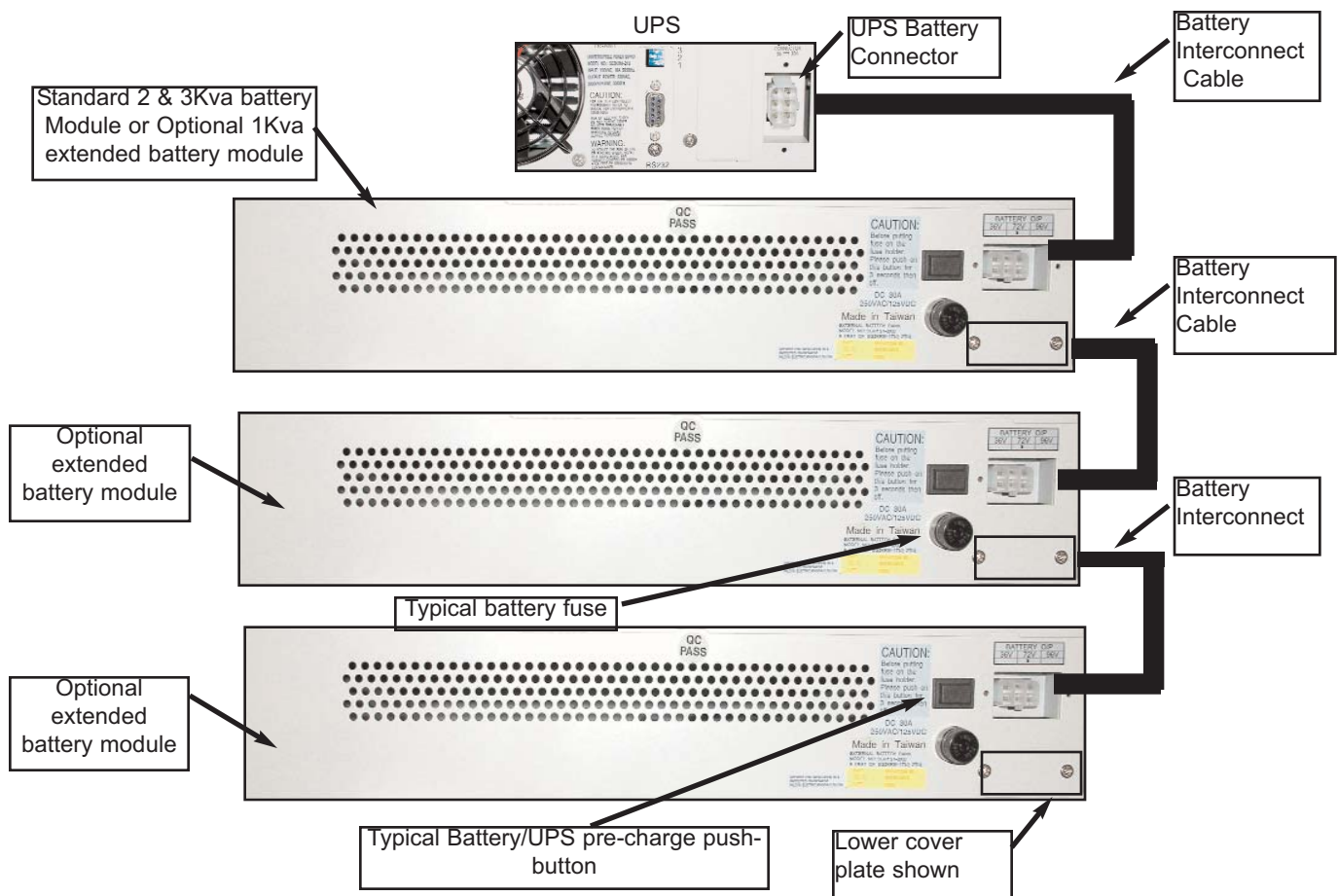






5. For all 1kVA & (-2) 2-3kVA models, connect the power cord to the UPS inlet located on the UPS rear panel. On (-1) 2 & 3Kva models the line cord is permanently attached to the UPS.
6. Connect the power cord(s) for the equipment to be protected to the UPS output receptacles.
7. For all 2 & 3kVA models remove the two screws securing the battery connector cover plate on the UPS module rear panel. Next remove the two screws securing the upper battery connector cover plate located on the battery module rear panel. Connect one end of the battery interconnect cable to the mating battery connector on the UPS. On the primary battery bank remove the battery fuse and connect the other end of the battery cable to the upper battery connector (located on the battery bank rear panel). Depress and hold the precharge pushbutton while reinstalling the battery fuse
8. If additional extended battery modules are to be installed, perform the following:
  - a. Perform the preparation outlined in preceding paragraphs 3a, 3b, and 3c.
  - b. Connect the supplied battery interconnect cable(s). Connect one end of the battery interconnect cable to the mating lower battery connector on the first battery module. On extended battery bank, depress the pre-charge pushbutton located on the rear panel, and hold while connecting the other end of the battery cable to the upper extended battery connector (located on the battery bank rear panel). For additional extended battery modules repeat step 8.

#### BATTERY MODULE INTERCONNECT WIRING





8. If unattended computer shutdown and monitoring are desired, connect the green UPS/Computer cable to the DB-9 connector located on the UPS rear panel. Then install the shutdown and monitoring software provided with the UPS. For your reference, UNIX shutdown and monitoring software is available from Falcon Electric at an additional cost.
9. Verify the location selected has adequate ventilation to allow for the proper cooling of the UPS.

### **WARNING**

**DO NOT BLOCK UPS FANS OR AIR VENTS. THE UPS MUST NOT BE INSTALLED IN AN ENCLOSED AREA.**

11. Plug the UPS power cord into the nearest grounded outlet.
12. Turn the input circuit breaker located on the UPS front panel to the "on" position. The internal UPS fan and front panel "line" indicator should turn on, followed by the "bypass" LED, and after several seconds, the "inverter" LED.
13. Turn on the connected equipment and verify the UPS does not go into overload by observing the front panel load indicator LEDs.
14. The UPS, should be plugged in and turned on for 24 hours to charge the batteries. During this initial 24 hour charging period, battery backup time may be substantially reduced.

### **IMPORTANT**

**TO TURN OFF THE UPS, SWITCH OFF THE INPUT CIRCUIT BREAKER LOCATED ON THE UPS FRONT PANEL AND PRESS THE ON/OFF BUTTON LOCATED ON THE UPS FRONT PANEL UNTIL THE UPS BEEPS.**

**THE UPS WILL RUN FOR ABOUT 30 SECONDS AND SHUTDOWN.**

**DO NOT PRESS THE ON/OFF BUTTON OR TURN THE CIRCUIT BREAKER ON AGAIN DURING THE SHUTDOWN PROCESS OR THE UPS WILL GO TO AN ALARM CONDITION, WARNING THAT THE UPS WAS NOT SHUTDOWN PROPERLY.**

**SHOULD THIS OCCUR, TURN OFF THE INPUT CIRCUIT BREAKER AGAIN AND WAIT UNTIL THE UPS SHUTS DOWN.**

### OPTIONAL SLIDE MOUNTING KIT (SGRMKIT)

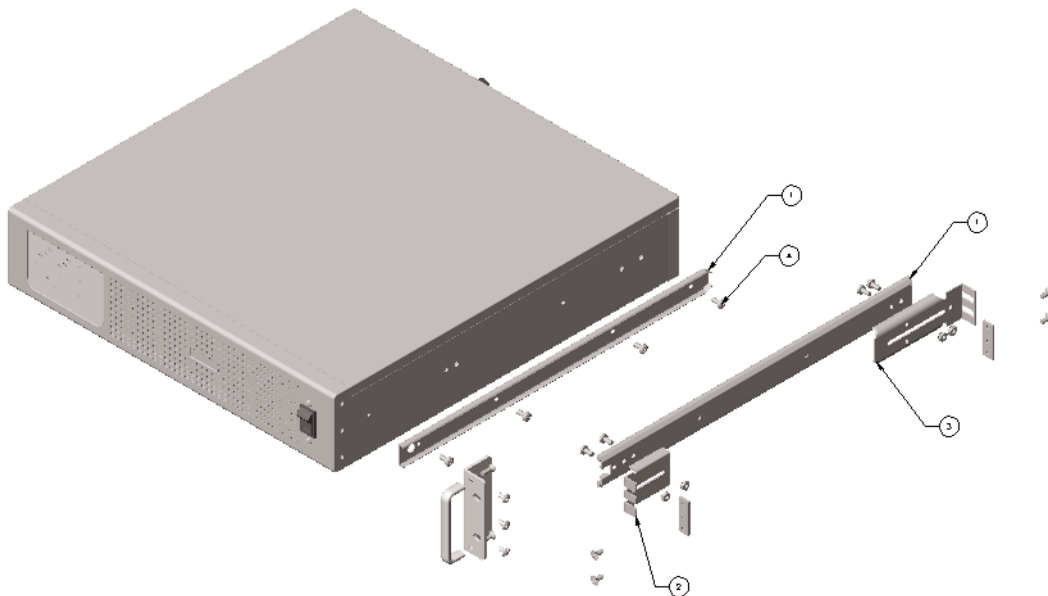
An slide mounting kit option is available from Falcon Electric. The part number for the kit is SGRMKIT and may be installed on any rackmount UPS and battery bank referenced in this manual. As all 2-3kVA models consist of seperate UPS and battery bank modules, two slide mounting kits are required , one for each module. All 1kVA UPS models will only require one slide kit.

#### Slide Installation Instructions

**NOTE:** Only use the referenced lenght screws when mouning the slides to the sides of the UPS and battery module or UPS damage may result.

1. Install the slides per the following diagram.

**Slide Mounting Details**



- 1. Slide, General Devices #CLB-203-16
- 2. Slide Mounting Bracket (Short)
- 3. SLide Mounting Bracket (Long)
- 4. Screws, 8-32 x 3/16" Phillips Pan Head

Qty. 2  
Qty. 2  
Qty. 2  
Qty. 8 (DO NOT USE LONGER SCREWS)

## SG RACKMOUNT EXTENDED BATTERY BANK SELECTION GUIDE

### FOR 1KVA MODELS

BATTERY OPTION MODEL	SG1KRM-1T	SGBR2S7-1KU	SGBR2S7-1KU	SGBR2S7-1KU	SGBR2S7-1KU
BATTERIES	7AH x 3	7AH x 6	(7AH x 6) x 2	(7AH x 6) x 3	(7AH x 6) x 4
BATTERIES IN UPS	Batteries & UPS in same case	7AH x 3	7AH x 3	7AH x 3	7AH x 3
# OF BATTERY CASES	UPS	1	2	3	4
RUN TIME @ 100W	54 Min.	220 min.	400 Min.	590 Min.	760 Min.
RUN TIME @ 200W	25 Min.	100 Min.	190 Min.	280 Min.	380 Min.
RUN TIME @ 400W	11.5 Min.	45 Min.	90 Min.	140 Min.	190 Min.
RUN TIME @ 700W	7 Min.	24 Min.	45 Min.	72 Min.	100 Min.
CHARGER TYPE	800ma/41.1Vdc	Contact Factory			
NO. OF CHARGERS	1 (UPS)	0	0	0	0

### FOR 2KVA MODELS

BATTERY OPTION MODEL	SGBR1S7-2KU	SGBR1S7-2KU	SGBR1S7-2KU	SGBR1S7-2KU	SGBR1S7-2KU
BATTERIES	7AH x 6	(7AH x 6) x 2	(7AH x 6) x 3	(7AH x 6) x 4	(7AH x 6) x 5
BATTERIES IN UPS	NONE				
# OF CASES	1 Comes with UPS	2	3	4	5
RUN TIME @ 300W	40 Min.	92 Min.	112 Min.	225 Min.	300 Min.
RUN TIME @ 500W	24 Min.	55 Min.	95 Min.	135 Min.	180 Min.
RUN TIME @ 700W	17 Min.	40 Min.	70 Min.	100 Min.	140 Min.
RUN TIME @ 1000W	11 Min.	25 Min.	42 Min.	60 Min.	80 Min.
RUN TIME @ 1400W	7 Min.	16 Min.	26 Min.	38 Min.	62 Min.
CHARGER TYPE	Inside UPS	Contact Factory			
NO. OF CHARGERS	0	0	0	0	0

### FOR 3KVA MODELS

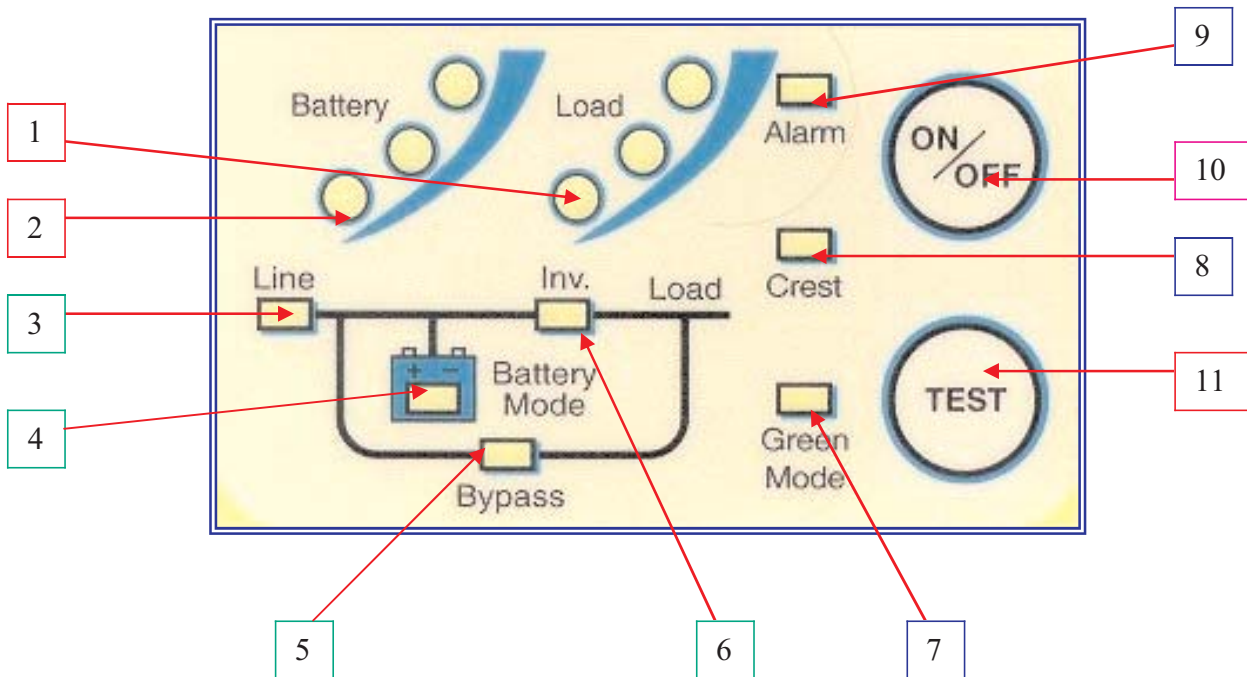
BATTERY OPTION MODEL	SGBR1S7-3KU	SGBR1S7-3KU	SGBR1S7-3KU	SGBR1S7-3KU	SGBR1S7-3KU
BATTERIES	7AH x 8	(7AH x 8) x 2	(7AH x 8) x 3	(7AH x 8) x 4	(7AH x 8) x 5
BATTERIES IN UPS	NONE				
CASE	SGBR1S7-3KU X 1 Comes with UPS	2	3	4	5
RUN TIME @ 500W	33 Min.	96 Min.	160 Min.	230 Min.	320 Min.
RUN TIME @ 1000W	17.5 Min.	50 Min.	84 Min.	120 Min.	165 Min.
RUN TIME @ 1500W	10 Min.	30 Min.	51 Min.	77 Min.	105 Min.
RUN TIME @ 2100W	6 Min.	19 Min.	35 Min.	51 Min.	70 Min.
CHARGER TYPE	Comes with UPS	Contact Factory			
NO. OF CHARGERS	Inside UPS	0	0	0	0

**NOTE:** The backup times stated are for reference only. Backup time may vary due to the type of load, battery age or condition, environmental conditions, etc.

# CHAPTER 3

## OPERATION

UPS FRONT PANEL INDICATOR AND FUNCTION KEYS



### **1. LOAD LEVEL INDICATOR LEDS**

\*The first or bottom LED is lit when the output load is greater than 25% of the rated output of the UPS.

\*The second LED is lit when the output load is greater than 50% of the rated output of the UPS.

\*The third LED is lit when the output load is greater than 75% of the rated output of the UPS.

### **2. BATTERY LEVEL INDICATOR LEDS**

\*The third or top LED is lit when the battery is fully charged.

\*The Second LED is let when the battery level is above the low battery warning Level.

\*The first LED is lit when the battery level is above the battery cutoff voltage.

### **3. LINE / SITE WIRING FAULT INDICATOR LED**

For models configured for standard 120 volt domestic usage, this LED is lit to a steady on state when Utility voltage is present. However, should the LED flash on and off, it is an indication that the HOT and NEUTRAL wires are reversed some where in the building wiring. Typically at the wall outlet.

It is normal for this LED to flash with 208 and 240 volt domestic models as these voltages are normally LINE to LINE, without a neutral.

### **4. BATTERY MODE INDICATOR LED**

This LED is lit when the unit is operating from battery.

5. **BYPASS INDICATOR LED**

When this LED is lit the UPS bypass is active. Should the Alarm LED be lit at the same time, the UPS detected an internal failure and the UPS must be serviced.

6. **INVERTER INDICATOR LED**

When this LED is lit, the UPS inverter is operating and powering the connected load.

7. **GREEN MODE LED INDICATOR**

This LED is lit when the connected output load of the UPS drops to under 10% of the full rated output of the UPS, providing SW3 is in the "down" position (Green Mode Enabled) as shown on page 7. The UPS is automatically set to bypass mode and the inverter is turned off, reducing the power requirement. **NO BATTERY BACKUP IS PROVIDED IN THIS MODE.** (The UPS is shipped from the factory with SW3 in the "up" or disabled position.)

8. **OVER CREST INDICATOR LED**

This LED lights when the connected load getting close to the peak current rating of the UPS.

9. **ALARM INDICATOR LED**

This LED is lit during the following conditions:

- a. The inverter voltage is too high or low.
- b. UPS over-temperature condition.
- c. The battery voltage is too high.
- d. The internal DC Bus has an under or over voltage condition.
- e. The internal microprocessor or memory failure.

10. **ON / OFF BUTTON**

**The following describes the different modes of operation for this button:**

- a. Depressing this button when the UPS is off, and the utility voltage is not present, or with the UPS input circuit breaker in the off position, will cause the UPS to DC start and run on internal battery until the ON/OFF button is depressed again.
- b. Pressing this button while the UPS is on, and utility is present, will place the UPS into bypass mode.
- c. Pressing this button with the UPS input circuit breaker off, or when the utility voltage is not present, will turn off the UPS.

**TO TURN UPS ON:** CONNECT THE UPS TO UTILITY POWER AND TURN ON THE MAIN CIRCUIT BREAKER LOCATED ON THE FRONT PANEL. DO NOT PRESS THE "ON" BUTTON LOCATED ON THE FRONT PANEL OR THE UPS WILL BE PLACED INTO BYPASS MODE.

**TO TURN UPS OFF:** TURN OFF THE MAIN CIRCUIT BREAKER LOCATED ON THE FRONT PANEL AND DEPRESS THE "ON/OFF" BUTTON UNTIL THE UPS BEEPS AND WAIT FOR THE UPS TO SHUTDOWN AND TURN OFF (ABOUT 30 SECONDS).

11. **TEST BUTTON**

The following describes the different modes of operation for this button:

- a. Pressing the Test button while in Green Mode will reset Green Mode.
- b. Pressing the Test button while utility is present will put the UPS through a self test diagnostic.
- c. Pressing the Test button while in battery mode will turn the battery Audible alarm off. Depressing it again will turn the Audible alarm back on.

## AUDIBLE ALARMS

Audible alarm signals are divided into two different levels of alarm status. Category one alarms represent normal or correctable operational alarms. Category two alarms are sounded in the event of abnormal operation.

### 1. Category one alarms:

- a. Two short beeps followed by three short beeps.  
Notifies the user that the SG UPS is configured with the optional battery pack and is in BATTERY MODE.  
**-- --- = SG UPS IS IN BATTERY MODE**
- b. A continuous short beep.  
The SG UPS is operating from battery and is in a LOW BATTERY operation.  
**----- = SG UPS IS IN A LOW BATTERY CONDITION**
- c. One long beep prior to a short beep.  
The SG UPS is in an OVER LOADED, OVER CREST CONDITION. Remove some load from the UPS output to correct this condition.  
**--- = SG UPS IS IN OVERLOAD OR OVER CREST**
- d. One short beep is sounded when either the ON/OFF or TEST buttons are pressed and held. This notifies the user the associated actions have been initiated by the UPS.  
**- = WHEN SG UPS FRONT PANEL TEST BUTTON DEPRESSED.**

### 2. Category two alarms:

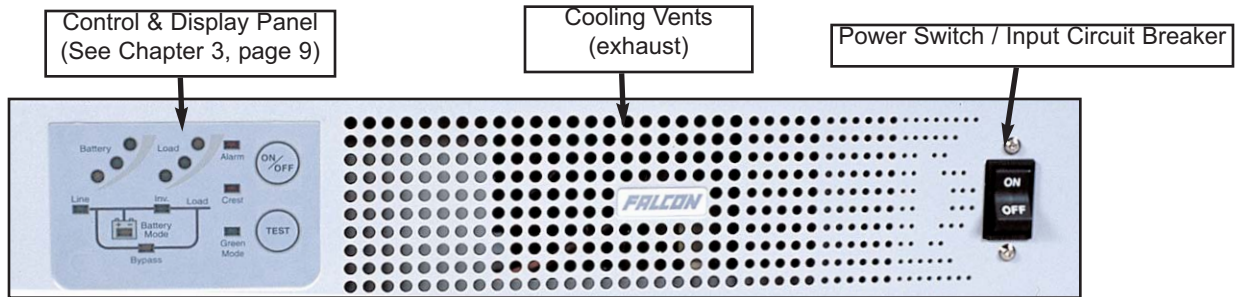
- a. Three short beeps indicate the SG UPS output voltage is out of proper operating range.  
**--- = SG UPS OUTPUT VOLTAGE IS OUT OF PROPER RANGE.**
- b. Four short beeps indicate the SG UPS output frequency is out of proper operating range. The UPS must be repaired.  
**---- = SG UPS OUTPUT FREQUENCY IS OUT OF PROPER RANGE.**
- c. Five short beeps indicate the SG UPS is in an over-temperature condition. Check for proper UPS cooling fan operation or blockage.  
**----- = SG UPS INTERNAL TEMPERATURE IS TOO HIGH.**
- d. Should the internal POWER UP SELF-TEST fail, the SG UPS will sound the following alarms denoting the failure mode:
  - \* A continuous rapid beeping for about 5 seconds, then the SG UPS shuts down - The UPS output voltage is out of range.  
**----- = UPS OUTPUT VOLTAGE IS OUT OF RANGE.**
  - \* A continuous rapid beeping for about 2 seconds and the SG UPS shuts down - The SG UPS performed a DC start, but there is no output frequency set in the UPS memory. Plug the UPS into your local utility power and turn the UPS on to set it for your local utility power frequency.  
**----- = The SG UPS performed a DC start, but there is no output frequency set in memory. Connect the UPS to your local utility power and turn on the UPS. Your local utility frequency is now set into the UPS memory. The next time the UPS is DC Started, its output frequency will be set automatically.**



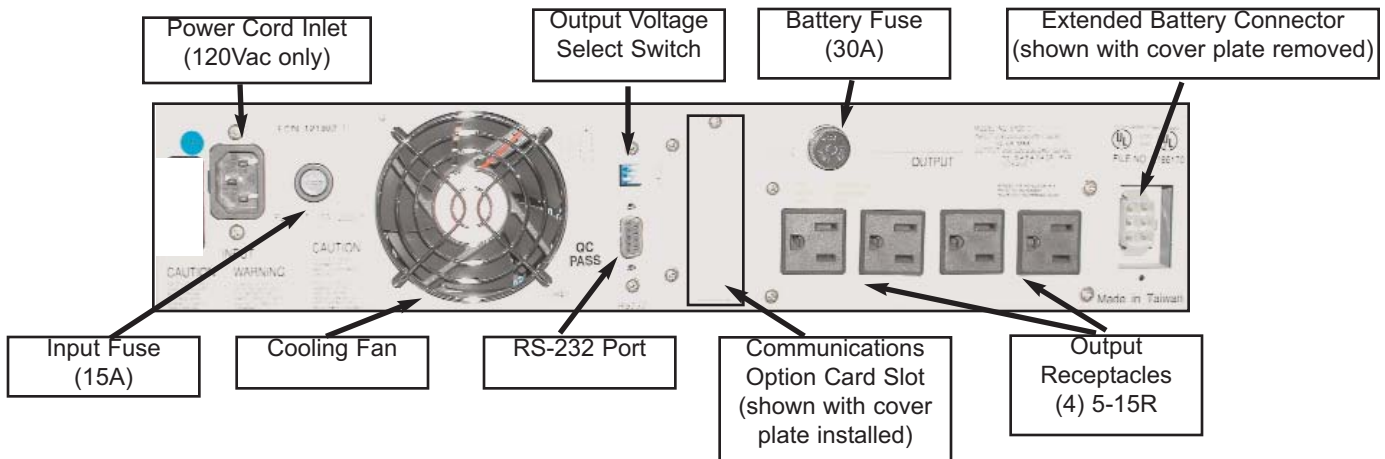
# CHAPTER 4

## FRONT & REAR PANEL DETAILS

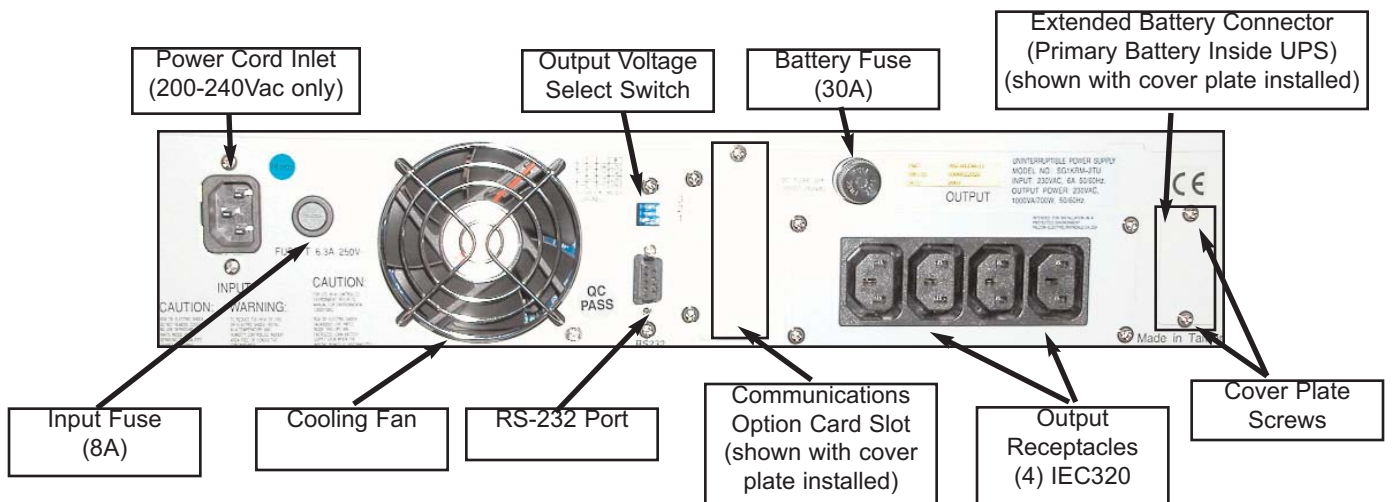
### Typical Front Panel Overview (All models)



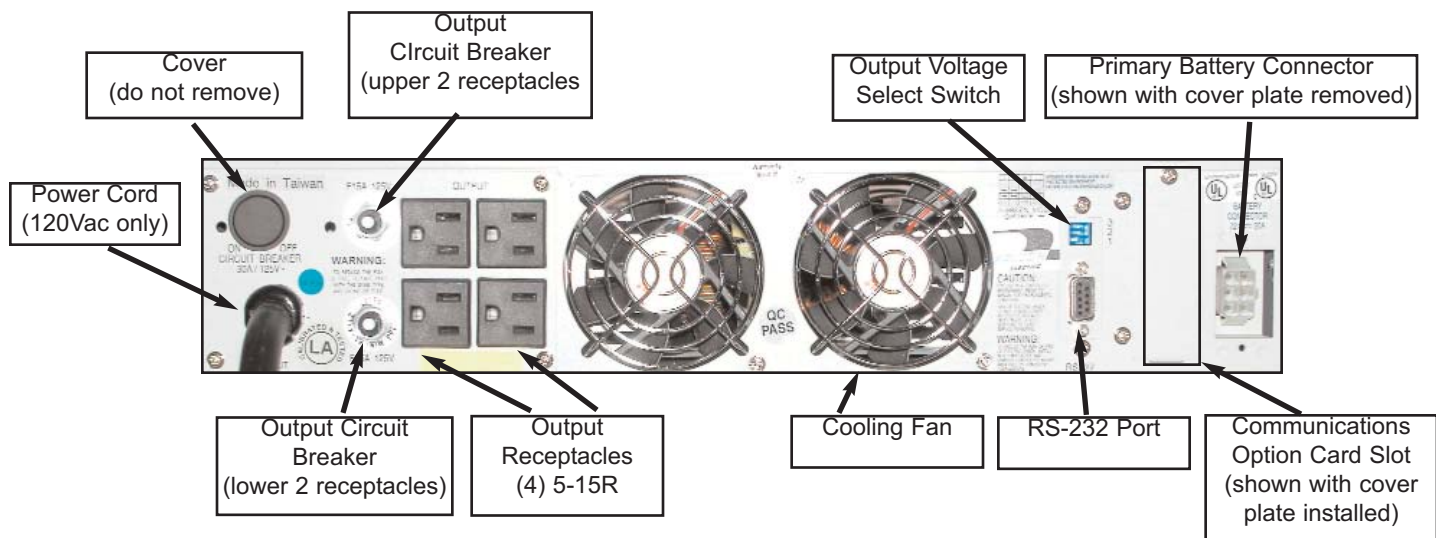
### SG1KRM-1TU Typical Rear Panel Overview



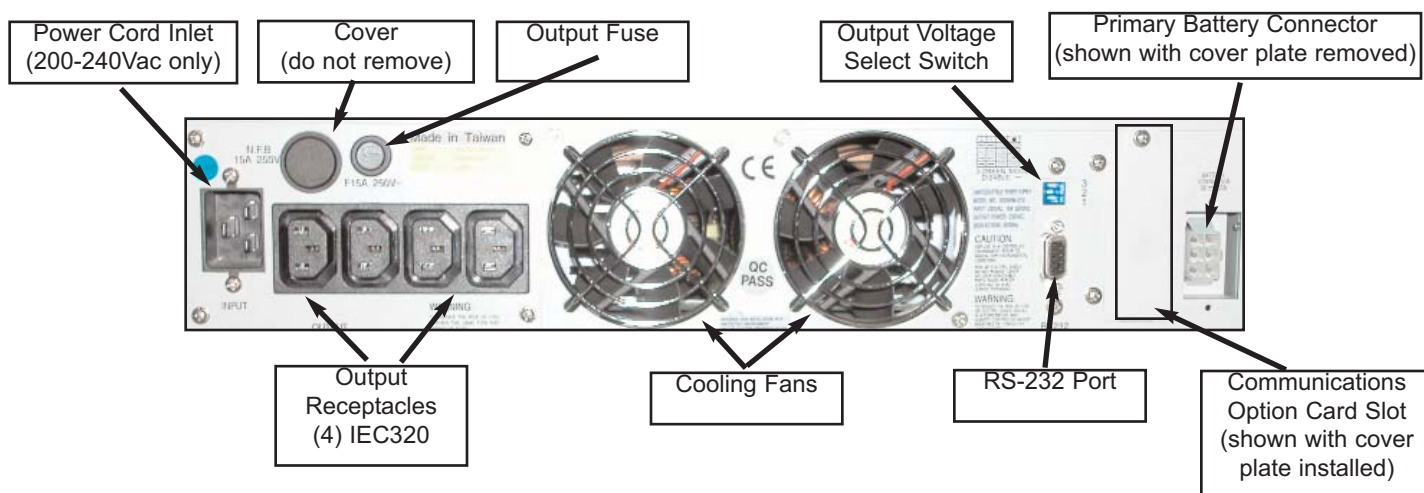
### SG1KRM-2TU Typical Rear Panel Overview



# **SG2KRM-1TU & SG3KRM-1TU** **Typical Rear Panel Overview**



# **SG2KRM-2TU & SG3KRM-2TU** **Typical Rear Panel Overview**



# CHAPTER 5

## COMMUNICATIONS INTERFACES

### RS-232 INTERFACE

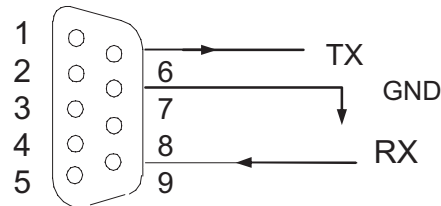
#### Location:

The RS-232 interface is standard on all SG series UPS models. The port is located on the UPS rear panel, via a DB-9 female connector.

#### Supported Protocols

UPSILON 2000 & SEC Smart Mon

BAUD RATE ----- 2400bps  
DATA LENGTH---- 8 bits  
STOP BIT----- 1 bit  
PARITY----- None



DB-9 Connector Pin Assignment

Pin #	Function explanation	I/O
9	RS 232 Rx	INPUT
6	RS 232 Tx	OUTPUT
7	Ground	

#### CAUTION

When making a connection between a computer and the UPS RS-232 port, always use the green cable supplied with the UPS due to the proprietary pin-out of the RS-232 port.

#### CAUTION

There are communications options that WILL DISABLE the RS-232 port and render it inoperable. The options are as follows:

- Internal SNMP/HTTP agent option installed into the UPS communications option slot.

The following options WILL NOT affect the operation of the RS-232 port:

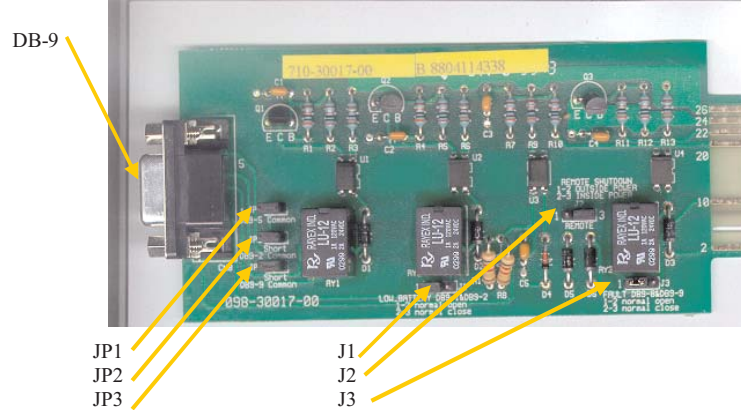
- Falcon Opto Coupler based signal interface board installed in the communications option slot.
- Any Falcon relay based, dry contact signal interface board installed in to the communications option slot.

#### CAUTION

DB-9 Signals are not isolated and intended for connection to like RS-232 interfaces. **DO NOT APPLY ANY OTHER VOLTAGES TO THESE PINS!**

## DRY CONTACT & OPTO COUPLER INTERFACE BOARD OPTIONS

### Typical Falcon Dry Contact Relay Board



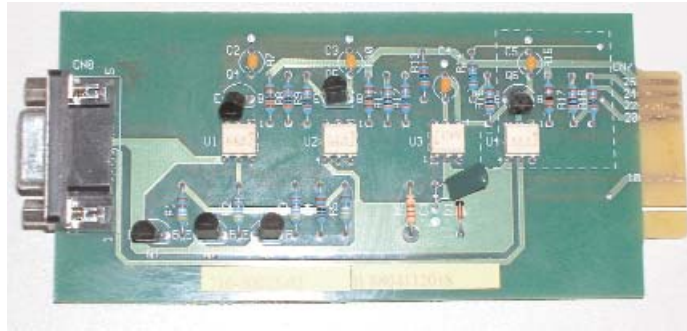
### PIN & JUMPER ASSIGNMENT FOR THE FALCON UA88374 RELAY OPTION BOARD (no on-bypass signal)

PIN	DESCRIPTION
1	Low Battery ( When UPS reaches low battery, contact activates) (J1, 1-2 short = N.O) (J1, 2-3 short = N.C)
2	JP2 shorted = Low Battery common & all other shorted JP commons JP2 open = common for low battery only
3	Utility Loss N.O. ( At loss of utility voltage, contact activates)
4	Utility Loss N.C. ( At loss of utility voltage, contact activates)
5	JP1 shorted = Utility Loss common & all other shorted JP commons JP1 open = Utility Loss common only
6	Remote Shutdown common
7	Remote Shutdown (J2, 1-2 short = outside power) (J2, 2-3 short = inside power) <u>1-2 shorted.</u> Applying an external 12V signal across the DB-9, pins six and seven, while the UPS is on battery, will turn the UPS off. <u>2-3 shorted.</u> Applying a short directly across the DB-9, pins six and seven, while the UPS is on battery, will turn the UPS off.
8	Alarm (Upon a UPS fault or failure the contact activates) (J3, 1-2 short = N.O.) (J3, 2-3 short = N.C.)
9	JP3 shorted = Alarm common & all other shorted JP commons JP3 open = Alarm common only

### PIN & JUMPER ASSIGNMENT FOR THE FALCON UA88376 RELAY OPTION BOARD (with on-bypass signal)

DB-9F PIN & JUMPER ASSIGNMENTS	
PIN	DESCRIPTION
1	Low Battery ( When UPS reaches low battery, contact activates) (J1, 1-2 short = N.O) (J1, 2-3 short = N.C)
2	JP2 shorted = Low Battery common & all other shorted JP commons JP2 open = common for low battery only
3	Utility Loss N.O. ( At loss of utility voltage, contact activates)
4	Utility Loss N.C. ( At loss of utility voltage, contact activates)
5	JP1 shorted = Utility Loss common & all other shorted JP commons JP1 open = Utility Loss common only
6	Remote Shutdown common
7	Remote Shutdown (J2, 1-2 short = outside power) (J2, 2-3 short = inside power) <u>1-2 shorted.</u> Applying an external 12V signal across the DB-9, pins six and seven, while the UPS is on battery, will turn the UPS off. <u>2-3 shorted.</u> Applying a short directly across the DB-9, pins six and seven, while the UPS is on battery, will turn the UPS off.
8	On Bypass or Alarm (Upon the UPS going to bypass or a UPS failure the contact activates) (J3, 1-2 short = N.O.) (J3, 2-3 short = N.C.)
9	JP3 shorted = On bypass, Alarm common & all other shorted JP commons JP3 open = On bypass, Alarm common only

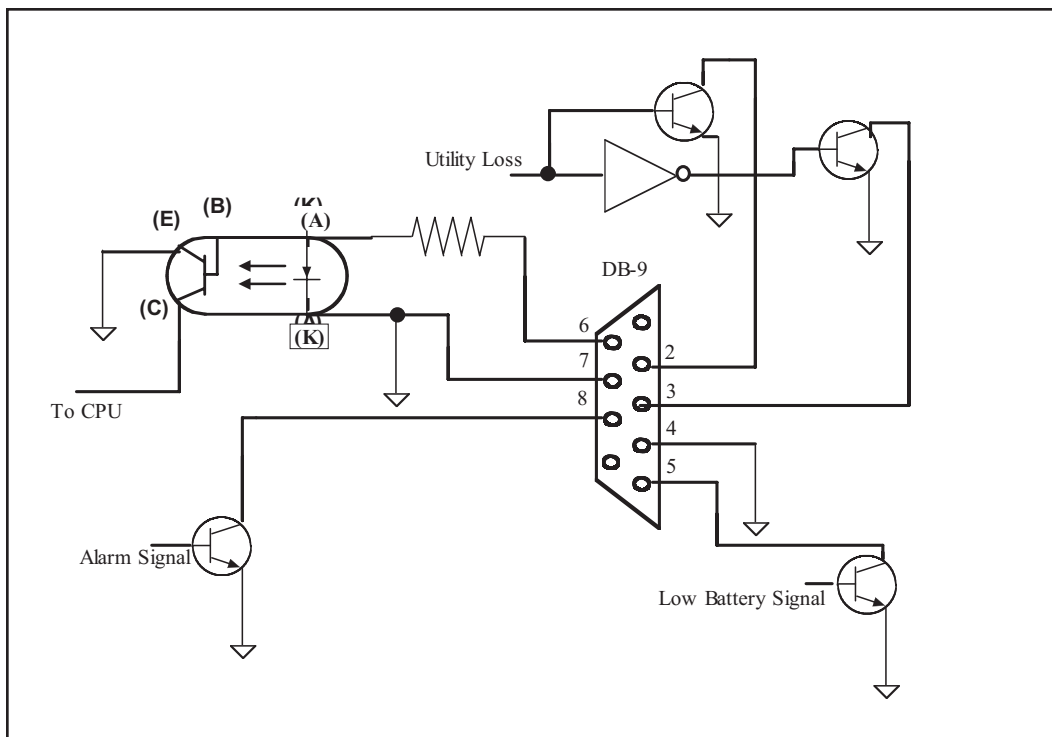
## Typical Falcon Opto-coupler Interface Card



### PIN ASSIGNMENT FOR THE FALCON UA88373 OPTO-COUPLER OPTION BOARD (no-bypass signal)

PIN	DESCRIPTION
1	Not Used
2	Utility Loss (N.O.) (Closes upon utility loss)
3	Utility Loss (N.C.) (Opens upon utility loss)
4	Common for pins 2, 3 & 5
5	Low Battery (N.O.) (Closes at low battery)
6	Remote Shutdown Applying a +5-+12Vdc voltage level for >500ms, while the UPS is on battery will shutdown the UPS
7	Not Used
8	Not Used
9	Not Used

### OPTO Board Internal Circuitry



## Maintenance & Technical Support

### 1. **Care & Maintenance**

Falcon® SG Series UPSs are designed to be maintenance-free. They can be cleaned with a damp cloth or non-abrasive cleanser, providing the UPS is turned off and the input plug is disconnected from the utility source.

On a regular basis, check the vents to make sure they are kept free from accumulation of dust, dirt or lint.

### 2. **Battery Life vs. Temperature**

For full battery life, keep the UPS close to an ambient temperature of 77°F.

The batteries should never be exposed to temperatures below 40°F and above 104°F.

### 3. **Battery Replacement**

This UPS contains sealed maintenance-free batteries (VRLA). When situated in a typical office environment, with the proper charging and limited cycling, the batteries can last many years. **In home, office or computer room environments, the batteries should be replaced every three to five years.**

**Should you require battery replacement contact the Falcon Service Department (see page 20 for contact information).**

#### **WARNING**

Never attempt to service batteries. High voltage exists within the unit, which could cause electrical shock. **Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions.** Keep unauthorized personnel away from batteries.

When replacing the UPS batteries, use the same number and type of batteries.

#### **NEVER**

A. **NEVER** dispose of batteries in a fire, as batteries will explode.

B. **NEVER** dispose of used batteries or the UPS in the trash or landfill as it is a violation of federal and state laws. **The UPS and Batteries must be recycled.** For UPS and battery recycling information, please contact our service department for the name and address of the nearest battery recycling facility.

#### **CAUTION**

A. Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

B. A battery can present a risk of electrical shock and high short circuit current.

**REFER ALL BATTERY SERVICING OR REPLACEMENT TO A QUALIFIED SERVICE TECHNICIAN. NEVER ATTEMPT TO REPLACE THE BATTERIES YOURSELF.**



The following precautions should be observed by a qualified technician when working with batteries.

1. Remove watches, rings, or other metal objects.
2. Use tools with insulated handles.
3. Wear rubber gloves and boots.
4. Do not lay tools or metal parts on top of batteries.

4. **Storing the UPS and Batteries**

Should you need to store the UPS for a long period, fully recharge the battery just prior to storage and recharge the battery every 4 months by plugging the UPS into a power outlet. It is recommended that the batteries charge for 24 hours after long-term storage.

5. **FCC Considerations**

This equipment generates and uses radio frequency energy and if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. All models covered in this manual have been tested and found to comply with the limits for a Class A computing device, in accordance with the specifications in FCC regulations, Part 15, Subpart J, which are designed to provide reasonable protection against such interference.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- a. Reorient or relocate the receiving antenna.
- b. Increase the separation between the equipment and the receiver.
- c. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- d. Consult the dealer or an experienced radio/television technician for assistance.

## 6. **Technical Support**

Your FALCON® Electric SG Series UPS is backed by one of the finest customer service teams assembled. Write, call, fax or email should you require technical assistance or service.

Falcon Electric Inc.  
5106 Azusa Canyon Road  
Irwindale, CA. 91706  
Service 800.842.6940  
Voice 626.962.7770  
Fax 626.962.7720  
Email: [service@falconups.com](mailto:service@falconups.com)  
[WWW.FALCONUPS.COM](http://WWW.FALCONUPS.COM)

Please have your UPS model, serial numbers and date of purchase on hand prior to your call. This information is located on the identification label on the rear panel of the unit. This information is essential in retrieving your unit's historical records. Should our service department determine service is required, you will be given a Return Material Authorization number (RMA) along with return shipping instructions.

The RMA number issued must appear on the outside of the shipping carton. The original shipping container must be used when returning any SG Series product. Falcon® Electric will not assume any responsibility for shipping damage. In the event of shipping damage, you will be notified of the damage and be instructed to file a claim with the freight carrier. You will be billed for all repairs caused by the shipping damage. You must submit a copy of our repair invoice to the carrier for reimbursement.

All units must be returned prepaid. The address and shipping instructions will be given to you at the time the RMA is issued.

## 7. **Requesting Technical Information or Support**

You may request technical information or support by email or telephone.

Please send your technical or support questions by email to:

**[SUPPORT@FALCONUPS.COM](mailto:SUPPORT@FALCONUPS.COM)**

You may contact a FALCON support engineer directly by calling the FALCON support line between 9:00 am and 4:00 pm PST.

**800.842.6940**

## 8. **FALCON Web Support**

Product data sheets, specification and owner's manuals are available in Adobe® Acrobat .PDF format on our corporate website.

**[WWW.FALCONUPS.COM](http://WWW.FALCONUPS.COM)**

# LIMITED NEW PRODUCT WARRANTY AGREEMENT

## GENERAL PROVISIONS

FALCON® ELECTRIC INC., hereby warrants product shipped under this agreement to be free from defective workmanship for a period of two years following date of shipment. This Limited New Product Warranty Agreement only applies to covered repairs to the product occurring within the United States and Canada.

### EXCLUSIONS:

The following are not covered by the Falcon Electric Limited New Product Warranty:

1. DAMAGE DUE TO ACCIDENTS, FRAUD, INTENTIONAL NEGLIGENCE, MISUSE, IMPROPER INSTALLATION, UNAUTHORIZED ADJUSTMENTS, MODIFICATIONS, ALTERATIONS, DISCONNECTION, TAMPERING: Accidents or acts of nature or other events beyond the control of Falcon Electric, damage from impact, contaminants, fire, or water, misuse of the product such as sustained overloading, improper installation or operation, operation in an uncontrolled environment.
2. DAMAGE DUE TO IMPROPER INSTALLATION OR LACK OF MAINTENANCE: Lack of proper maintenance as outlined in the owner's manual.
3. NORMAL MAINTENANCE: Cleaning, replacement of leaking or outdated batteries.
4. DAMAGE DUE TO ALTERATIONS: Alterations by changing or adding to the product by any unauthorized personnel or service organization.
5. DAMAGE CAUSED BY OTHER THAN ORIGINAL EQUIPMENT PARTS. Any malfunctions caused by the use of other than Falcon Electric original equipment parts such as batteries, line cords and plugs, output receptacles, or any other part.
6. BROKEN OR TAMPERED WARRANTY SEALS: Falcon Electric will deem all warranties null and void in the event warranty seals are broken or show signs of removal or tampering.
7. CONSEQUENTIAL DAMAGES: This Limited New Product Warranty does not cover any consequential or secondary damages that may be suffered as a result of usage of the product or the need to repair or replace a warranted part except to the extent coverage of such damage is required by the state whose law governs the Falcon Electric Limited New Product Warranty.
8. REPAIRS BY UNAUTHORIZED SERVICE ORGANIZATIONS OR PERSONNEL: Otherwise covered repairs when the prescribed repair is not performed by the Falcon Electric Service Center or by a Falcon Electric authorized third party service organization.
9. LIABILITY FROM USE OF THE PRODUCT: Liability for damage to property or injury or death of any person arising out of the operation, maintenance, or use of the product.
10. Warranty void if the battery is allowed to discharge below the minimum battery cutoff point. To prevent such discharge, remove the battery fuse, or switch the battery disconnect to the off position when the unit is to be stored without the AC power being supplied to the UPS for more than two days. The battery must be recharged every three to four months when not in use.
11. This product is not recommended, and Falcon Electric Inc. will not knowingly sell this product, for use with life support and other designated "critical devices". ANY SUCH USE BY A USER AUTOMATICALLY VOIDS AND DISCLAIMS ANY AND ALL WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND EXPRESS WARRANTIES THAT THIS PRODUCT WILL CONFORM TO ANY AFFIRMATION OR PROMISE, FOR THIS PRODUCT AND THE USER AGREES THAT IN NO EVENT SHALL FALCON ELECTRIC INC. BE LIABLE FOR CONSEQUENTIAL OR INDIRECT DAMAGES.

### LIMITS OF LIABILITY:

LIMITATION OF LIABILITY: THERE IS NO LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE UNDER THESE WARRANTIES INCLUDING BUT NOT LIMITED TO, LIABILITY FOR INJURY, LOSS OF LIFE, PROPERTY DAMAGE, LOSS OF USE, LOSS OF DATA, LOSS OF TIME, INCONVENIENCE OR COMMERCIAL LOSS, OR BREACH OF IMPLIED OR EXPRESSED WARRANTIES. ANY AND ALL SUCH LIABILITY IS EXPRESSLY EXCLUDED. IN NO EVENT SHALL FALCON ELECTRIC BE RESPONSIBLE FOR ANY AMOUNT EXCEEDING THE ACTUAL MARKET VALUE OF THE PRODUCT. Some states do not permit the exclusions of limitations of incidental or consequential damages, so these limitations may not apply to you.

### TRANSFER:

This Falcon Electric Limited New Product Warranty is not transferable in the event of the product ownership being transferred during the warranty coverage period.

### ITEM COVERAGE:

Effective January 1, 2000, FALCON® ELECTRIC hereby warrants product shipped under this Agreement to be free from defective workmanship for a period of two years following date of shipment. Coverage under this Falcon Electric New Product Warranty Agreement commences with the date of shipment defined as the date on the Bill of Lading. If no Bill of Lading is issued, the date of shipment shall be shown on seller's shipping document. The Falcon Electric Limited New Product Warranties expire one year from the aforementioned commencement date. Falcon Electric Inc. reserves the right to make changes, additions, and/or other improvements in its products without incurring any obligation to install them on its products previously sold. This Warranty is valid for product as sold.

1. For product located in the continental United States and Canada deemed by Falcon Electric to be covered under this warranty, Falcon Electric will pay shipping costs associated with the return and repair of product under the following conditions only:
  - a. Falcon Electric will pay shipping costs both to and from our U.S. Service Center for the first 30 days from the original date of invoice. During this 30 day period, Falcon Electric may elect to ship a new unit to replace the defective product.
  - b. After the first 30 days and up to 90 days from the original date of invoice, the end-user is responsible for shipping costs associated with sending the defective unit to the Falcon Electric U.S. Service Center. Falcon Electric will pay shipping costs associated with returning the repaired product to the end-user. During this 60 day period Falcon Electric may elect to offer a loaner unit, providing the end-user agrees to pay for all shipping costs associated with transportation of the loaner unit both from and return to the Falcon Electric U.S. Service Center.
  - c. All shipping costs for product submitted beyond 90 days of the original date of invoice is the responsibility of the end-user.

Model Number	SG1KRM-1TU	SG1KRM-2TU	SG2KRM-1TU	SG2KRM-2TU	SG3KRM-1TU	SG3KRM-2TU
Nominal VA	1000		2000		3000	

## Electrical Input

Nominal AC Voltage	120V	230V	120V	230V	120V	230V
AC Voltage Range	87-140V	170-275V	87-140V	170-275V	87-140V	170-275V
Current-Amps	6.9	3.6	14.2	7.5	21.4	11.2
Frequency	50/60 Hz $\pm$ 5% (Auto-Tracking)					
Power Factor Correction	> 0.95					
Efficiency (Typical)	> 89%		> 86%			

## Electrical Output

Watts	700	700	1400	1400	2100	2100
AC Voltage (Switchable)	100V 110V 115V 120V	200V 220V 230V 240V	100V 110V 115V 120V	200V 220V 230V 240V	100V 110V 115V 120V	200V 220V 230V 240V
Frequency	50/60 Hz (Auto Tracking)					
Frequency Stability	$\pm$ 0.3% (Battery Mode)					
Voltage Regulation	$\pm$ 2%					
Step Load Change	$\pm$ 7% for 100% load variation					
Harmonic Distortion	< 3% Linear Load, < 5% Non-Linear Load					
Overload	105% load for 50 Seconds					
Crest Ratio	3:1					

## Battery

DC Voltage	48V		72V		96V	
Type	12V, 7AH Sealed Lead Acid Maintenance-Free					
Back Up Time	@ Full Load	6 Minutes		7 Minutes		5.5 Minutes
	@ 1/2 Load	19 Minutes		20 Minutes		15 Minutes
Recharge Time	8 Hours to 90%					

Battery times are approximate.

## Transfer Time

Line Fails/Recovers	Zero
UPS to Bypass or Reverse	< 4ms
After Overload	Auto Transfer to UPS

## Electrical Connections

Input	6' Cord with 5-15P	6' Cord with Schuko or 6-15P	6' Cord with L5-20P	6' Cord with Schuko or 6-15P	6' Cord with L5-30P	6' Cord with Schuko or L6-20P
Output	(4) 5-15R	(4) IEC320	(4) 5-15R	(4) IEC 320	(4) 5-15R	(4) IEC 320

Contact the factory for other input/output options.

## Environmental

Operating Temperature	0° C - 40° C (32° F to 104° F)
Humidity	10% to 95% Non-Condensing
Altitude	7,000 Feet
Cooling	Low Velocity Forced Air Fans
Audible Noise @ 1 Meter	< 55dBA

## Controls and Indicators

LED	Line, Inverter, Battery Reserve, Load, Bypass, Alarm, Crest, Battery & Load Capacity Level
Audible Alarms	DC Mode, Low Battery, Over/Under Voltage, Over/Under Frequency, High Temp., Over Load, Fault Alarm
Communications	RS-232 Serial Port (Bundled UPSilon 2000 Software)

## Mechanical

UPS Module Dimensions	3.51 x 16.8 x 17.7 (89 x 426.7 x 449.5)		3.51 x 16.8 x 17.7 (89 x 426.7 x 449.5)			
Battery Pack Dimensions	Internal to UPS Module		3.51 x 16.8 x 17.7 (89 x 426.7 x 449.5) External to UPS Module			
H x W x D Inches (mm)			2kVA & 3kVA are (2) cabinet configuration, Hot Swappable Batteries			
UPS Module Weight lb. (kg)	39 (18)		29 (13)		29 (13)	
Battery Pack Weight lb. (kg)	Internal		53 (24)		64 (29)	
Agency Listing	UL 1778, CUL, FCC Class A	CE available with Schuko plug only	UL 1778, CUL, FCC Class A	CE available with Schuko plug only	UL 1778, CUL, FCC Class A	CE available with Schuko plug only

## Available Options

Option A	60 Hz to 50 Hz Frequency Conversion
Option B	50 Hz to 60 Hz Frequency Conversion
Option C	SNMP/HTTP Network Card (Internal)
Option D	Standard Contact Closure Interface Card
External Battery Packs	Extended Run Time Battery Packs (minutes to hours)
Slide Rails	Heavy Duty Roller Bearing Slide Rails for side mounting

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